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Current Economic Analysis I-**32**

Industrial Fishery Products

Market Review and Outlook

Industry and Consumer Services Division

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INDUSTRIAL FISHERY PRODUCTS

MARKET REVIEW AND OUTLOOK

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SUMMARY

World production of fish meal, fish solubles, and fish oil was lower in 1977 than in 1976, and it is likely to remain low in 1978.

By contrast, U.S. production in the first half of 1978 was well above both low year-earlier and 1972-76 average levels for the first half. While it may be too optimistic to expect continuation of equally high rates of increase during the entire main season for menhaden (about May-October), 1978 should nevertheless be an excellent year in terms of U.S. output.

The combination of high U.S. production, low world production, and strong U.S. and world demand suggests underlying market strength for fish meal, fish solubles, and fish oil. Exports are likely to continue high. Prices appear to reflect changes anticipated during 1978, including the possible increase in exports of fish oil by net exporting countries. Of course, price volatility is always a possibility at this time of year. However, increased strong world demand for soybeans and other major feed-oil products has kept increased supplies of these major products from depressing prices in 1978, as they did in May-August 1977.

FISH MEAL

REVIEW: JANUARY - JUNE 1978

U.S. production and exports of fish meal were well above both year-earlier and 1972-76 average levels in the first 6 months of 1978 (table 1). Imports were down substantially.

Table 1.--U.S. supplies of fish meal, excluding shellfish meal, January-June 1977, 1978, and 1972-76 average

Component	1972-76 average	1977	1978	Change 77 to 78
	-Thousand short tons-			-Percent-
Production				
Menhaden 1/	64.7	69.5	105.0	+ 51
Anchovy	7.9	6.1	2/	-
Tuna-mackerel	20.1	16.8	21.0	+ 24
Unclassified	10.6	9.9	10.0 2/	-
Total	103.2	102.4	136.0	+ 33
Imports	72.5	53.8	14.9	- 72
New supplies	175.7	156.2	150.9	- 3
Exports	11.3	4.1	17.1	+ 313
Supplies, net	164.4	152.1	133.8	- 12

1/ May include small quantities made from other species.
2/ Anchovy meal included with unclassified in 1978 only.

Domestic Production

Higher production of menhaden meal accounted for much of the increase in U.S. total production of fish meal during January-June 1978. The landings of menhaden in the Gulf were well ahead of a year earlier. Although the landings in the Atlantic were well behind, environmental conditions, which had restricted landings earlier in the season, have been returning to normal.

The landings of the California anchovy and mackerel fisheries have been low. Fishing was reduced while the negotiations that began in December 1977 between fishermen and vessel owners continued. In the anchovy reduction fishery, the catch totaled about 75,000 short tons (preliminary-revised), or about 65 percent of the combined total quota of 115,000 short tons for the Northern and Southern Permit Areas for the season August 1, 1977, to May 15, 1978. In the 1976-77 season, the catch was about 107,000 short tons, or about 79 percent of the quota of 135,000 short tons. In the purse seine mackerel fishery, cannery receipts for January-June 1978 were close to 12,000 short tons, roughly half the 1977 level and close to the 1976 level. The impact of the decline in the California mackerel fishery on the production of tuna-mackerel meal was easily offset by the increase in total U.S. cannery receipts of tuna and bonito.

U.S. Imports and Exports

Abnormally low imports in the first 6 months of 1978 were attributed to two factors: the continuation of generally tight world supplies, and price differentials favoring shipment to Europe and Japan rather than to the United States. Canada was the leading supplier of imported fish meal to the United States, as in 1977, while shipments from Peru and Norway were conspicuously absent.

U.S. exports exceeded imports of fish meal in the first half of 1978, as in the last quarter of 1977. Exports in January-June 1978 were about four times the 1977 level, and 51 percent above the 1972-76 average level (table 1). Imports during this period were 72 percent below the 1977 level, and 79 percent below the 1972-76 average level.

Developments in Major Exporting Countries

Among the major exporting countries, total production was slightly higher in January-June 1978 than a year earlier (table 2). A substantial decline occurred for Norway, the leading producer and exporter in 1977. Production of fish meal in Norway was about 198,000 metric tons in January-June 1978, 32 percent less than a year earlier, and 27 percent less than in 1976. Norway experienced difficulties with the winter capelin fishery, apparently because of anomalies in weather conditions, fish migration patterns, and/or other factors. The winter and summer capelin

Table 2.--Supply and utilization of fish meal for major exporting countries, January-June 1977 and 1978 1/

Component	1977	1978	Change
	- Thousand metric tons-		-Percent-
Beginning stocks	327	283	- 14
Production	739	755	+ 2
Total supply	1,066	1,038	- 3
Exports	684	558	- 18
Domestic use	79	65	- 18
Total disappearance	763	623	- 18
Ending stocks	303	415	+ 37

1/ Includes Chile, Iceland, Norway, and Peru.

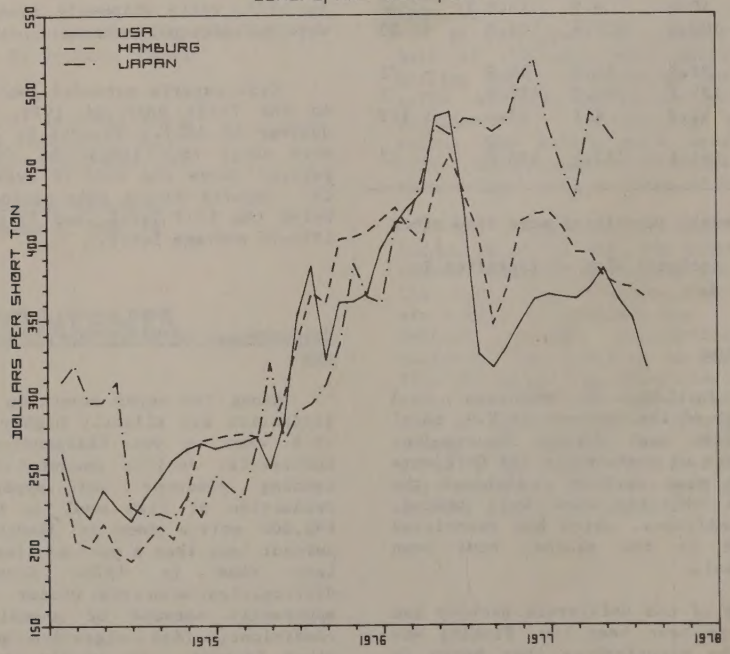
fisheries have been the major source of raw material for the Norwegian fish meal and oil manufacturing industry in recent years.

Peru, the second ranked producer and exporter in 1977, is continuing in 1978 with fishery regulations intended to conserve and rebuild the anchovy resource. Peru's production of fish meal was 289,000 metric tons in January-June 1978, 17 percent more than in 1977, but 52 percent less than in 1976.

Denmark, the third ranked producer and exporter in 1977, continues to face the complex of resource-related constraints that began to have a substantial impact in 1977. Danish exports were, however, 4 percent more than a year earlier in January-June 1978 at 124,900 metric tons.

Among other major exporting countries, Chile produced about 163,000 metric tons of fish meal in January-June 1978, or about 74 percent more than last year. Iceland produced 106,000 metric tons, about the same as last year. Production in South Africa, 164,000 metric tons, was 9 percent above a year earlier, although virtually none was exported.

Figure 1.--PRICES OF FISH MEAL IN THE UNITED STATES, EUROPE, AND JAPAN, 1975-78



Hamburg: 65 percent protein, any origin, c & f.

United States: 60 percent menhaden meal, bulk, quoted by brokers at New York City, f.o.b. East Coast and Gulf plants.

Japan: Average unit value of fish meal imported into Japan.

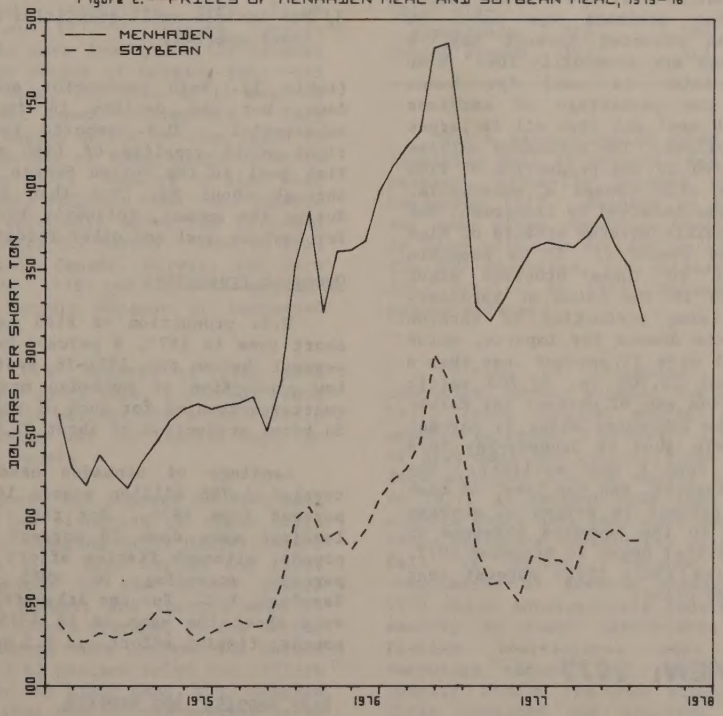
Prices

Prices of fish meal in the United States, Europe, and Japan in the period December 1977 through July 1978 (fig. 1) moved downward, closer to the price of soybean meal (fig. 2) and toward a closer, tighter pattern internationally, such as prevailed for much of the period from about mid-1975 to May 1977. Prices of menhaden meal in the United States fell to $319 per short ton in July 1978, after having trended upward from $319 in August 1977 to $383 in April 1978. The ratio of the price of fish meal to the price of soybean meal (50 percent protein) rose from an average of about 1.75 in the first half of 1977 to 2.07 in the second half; the ratio averaged 2.10 in January-April and 1.84 in May-July 1978. This lower ratio suggests that feed mixers are willing to use more fish meal in preparing formulas with various possible ingredients. Such considerations, along with the substantial improvement in menhaden landings at the beginning of the new season in May and the declining prices of fish meal in Europe and Japan, could all have contributed to the lower prices of menhaden meal in May-July 1978.

Prices of fish meal in Europe were also rising in the second half of 1977, but they, like prices in Japan, turned downward before the price decline in the United States. European prices were for the most part significantly higher than United States prices from June 1977 through July 1978, thereby encouraging European imports from the United States and discouraging exports to the United States.

Prices of fish meal in Japan have been distinctly higher than prices in the United States and Europe since April 1977. Expressed in yen, they were relatively steady in April-November 1977 at about 139,000 to 145,000 yen per metric ton. They began to fall in December 1977 and were about 114,000 to 119,000 yen in January-May 1978 (latest available data). The price in May 1978 was $464 per short ton (115,815 yen per metric ton), compared with $471 per short ton (144,184 yen per metric ton) a year earlier, a drop of 1.5 percent in terms of dollars, and 19.7 percent in terms of yen. The difference in these percentages relates to the changes in the currency exchange rate (about 278 yen per dollar in May 1977 and about 226 yen per dollar in May 1978).

Figure 2.--PRICES OF MENHADEN MEAL AND SOYBEAN MEAL, 1975-78



Menhaden meal: 60 percent protein, bulk, f.o.b., East Coast ports.

Soybean meal: 50 percent protein, bulk, Decatur, Ill.

The relatively high Japanese prices and the recent declines in those prices may be explained as follows. In 1977, Japan's market reaction to reduced Japanese access to resources within the extended jurisdiction zones of other countries included a determined effort to secure stable supplies of fish meal from foreign sources. With the incentive of relatively high prices, Japan imported over three times as much fish meal in 1977 as in 1976 (178,500 vs. 55,600 metric tons) and exports fell from 49,000 to 37,500 metric tons. However, Japanese production rose in 1977 to 780,000 metric tons, including fish meal and dried press cake, from 738,000 metric tons in 1976. The apparent reason for the increased production of fish meal was that the increased catch of sardines offset the reduced catch of Alaska pollock. The sardine catch had declined during the 1960's but has been increasing since 1972 because of the effect of directional changes in the warm Kuroshio current on the resource. The sardine catch was an estimated 1.4 million metric tons in 1977 compared with 570,000 metric tons in 1975 and 1.1 million metric tons in 1976. Japanese sources familiar with sardine resource expect that the 1978 catch will be close to the 1977 level, although Japanese press reports indicated a catch estimate of 2.0 million metric tons. The higher estimate was based on increases that had occurred through May, a period when landings are seasonally low. Some of the sardine catch is used for human consumption, but the percentage of sardines processed into fish meal and fish oil is larger than for Alaska pollock. The increased sardine catch has contributed to the production of fish meal, but it has also caused a substantial decline in the prices received by fishermen, and a concern about possible adverse effects of high catch rates on the resource. It is possible that the solution to these problems might include limitations in the catch of sardines. Regardless, the rising production of sardine meal has reduced the demand for imports, which in January-May 1978 were 22 percent less than a year earlier (about 52,700 vs. 67,700 metric tons). The reduction was 62 percent for March-May. Also, exports increased about 51 percent (about 20,900 metric tons in January-May 1978 vs. 13,800 metric tons a year earlier). The improved supply situation, and the level of fish meal prices with respect to prices of soybean meal in Japan led to the downward pressure on prices of fish meal that began in December 1977. Recent press reports (July 1978) suggest that further declines may occur.

REVIEW: 1977

New supplies of fish meal (production plus imports) in the United States totaled about 355,000 short tons in 1977, about 20 percent below both the 1976 and 1972-76 average levels (table 3). Both production and imports were down, but the decline in imports was more substantial. U.S. exports rose, because of tight world supplies of fish meal. Prices of fish meal in the United States and Europe rose through about May, but then declined sharply during the summer, following the lead of prices for soybean meal and other feedstuffs.

Table 3.--U.S. supplies of fish meal, excluding shellfish meal, 1976, 1977, and 1972-76 average

Component	1972-76 average	1976	1977	Change 76 to 77
	-Thousand short tons-			-Percent-
Production				
Menhaden 1/	198	213	193	- 9
Anchovy	19	22	19	-14
Tuna - mackerel	42	40	40	- 1
Unclassified	25	24	22	-11
Total	285	299	274	- 8
Imports	157	140	81	-42
Total new supplies	442	439	355	-19
Exports	30	33	36	+ 9
Supplies, net	413	406	319	-21

1/ May include small quantities made from other species.

Domestic Production

U.S. production of fish meal was 274,000 short tons in 1977, 8 percent below 1976, and 4 percent below the 1972-76 average (table 3). Low production of menhaden meal in the third quarter accounted for much of the year's decline in total production of about 25,000 short tons.

Landings of menhaden used for reduction totaled 1,796 million pounds in 1977, down 12 percent from 1976. For the Gulf of Mexico, landings were down 20 percent to 986 million pounds, although fishing effort was down only 8 percent according to NMFS biologists at Beaufort, N.C. For the Atlantic coast, landings were about the same as in 1976 at 810 million pounds; fishing effort was 6.5 percent higher.

U.S. Imports and Exports

U.S. imports of fish meal were 81,000 short tons in 1977, 42 percent below 1976, and 48 percent below the 1972-76 average (table 4).

Table 4.--U.S. imports of fish meal, by country of origin, 1976, 1977, and 1972-76 average

Country of origin	1972-76 average	1976	1977	Change 76 to 77
	-Thousand short tons-			-Percent-
Canada	30	34	25	- 27
Norway	7	16	24	+ 48
Peru	116	79	16	- 80
Other	3	11	17	+ 58
Total	157	140	81	- 42

Most of the decline in imports traces to the sharply reduced exports from Peru, which were related to that country's low anchovy resource. By virtue of the drop in Peru's exports, Canada became the leading supplier of fish meal to the United States in 1977, although imports from both countries were below respective 1976 and 1972-76 average levels. Imports from Canada were down primarily because of the decline in output of herring meal--the catch of herring rose, but more of it went to products for direct human consumption. This shift in the utilization of the herring catch is associated with the Bay of Fundy project, which was implemented in 1977. Imports of fish meal from Norway were only slightly less than imports from Canada, but were well above the 1976 and 1972-76 average levels for Norway. Imports from countries other than Canada, Norway, and Peru also surpassed the 1976 and 1972-76 average levels in 1977, largely because of increased imports from Panama.

During 1977, U.S. exports of fish meal totaled about 36,000 short tons, 9 percent above the 1976 level, and 22 percent above the 1972-76 average. West Germany was the leading buyer in 1977 (23,000 short tons).

Both U.S. imports and exports of fish meal were affected by the situation of tight world supplies, and the changing price differentials during 1977 (fig. 1). That is, in the first half of 1977, prices in the United States exceeded those in Europe, and imports were 25 percent above the 1972-76 average; in the second half, prices in Europe were higher, and United States imports were 67 percent below the 1972-76 average level. On the other hand, U.S. exports were 63 percent below the 1972-76 average level in the first half of 1977 when U.S. prices were higher, and 76 percent above the 1972-76 average level in the second half, when U.S. prices were lower than prices in Europe.

Developments in Major Exporting Countries

Total production of fish meal by major exporting countries declined in 1977. Denmark, Peru, and South Africa experienced resource-related constraints; Chile and Norway had about the same output as in 1976, and Iceland alone increased production significantly. Output totaled about 1.52 million metric tons, 19 percent less than in 1976 in the FEO countries (Chile, Iceland, Norway, Peru, and South Africa, table 5).

Table 5.--Supply and utilization of fish meal for FEO countries, 1976 and 1977

Component	1976	1977	Change
	-Thousand metric tons-		-Percent-
Beginning stocks	185	353	+ 91
Production	1,886	1,519	- 19
Total supply	2,071	1,872	- 10
Exports	1,386	1,243	- 10
Domestic use	329	290	- 12
Total disappearance	1,718	1,560	- 9
Ending stocks	353	313	- 11

While production of fish meal in the FEO countries fell 19 percent, exports fell only 10 percent, primarily because of higher stocks beginning 1977. Exports to the United States and many other countries declined more or less in line with the decline in total exports from the FEO countries, but shipments to Japan more than tripled in 1977, because of the higher prices offered.

Turning to individual major exporting countries, Norway shipped the largest amount in 1977, about 450,000 metric tons. Norway's exports increased 8 percent, although production of fish meal was virtually the same as in 1976. Peru exported 436,000 metric tons of fish meal in 1977, 26 percent less than in 1976. Peru's exports would have been much smaller without the large beginning inventories in 1977. Production fell 41 percent, because of an unusual combination of adverse oceanic conditions in 1976 which substantially reduced the number of anchovy to reach harvestable size in 1977. Fishing restrictions were introduced to encourage recovery of the anchovy resource. Despite Peru's resource problems, neighboring Chile produced and exported about the same amount of fish meal as in 1976. In South Africa, there has been increasing demand for feed for the growing broiler industry. This meant that resource-related declines in

production of fish meal (down 37,000 metric tons) affected exports primarily (down 34,000 metric tons) rather than domestic utilization (down 9,000 metric tons). Domestic utilization was about 157,000 metric tons in 1977 and accounted for 92 percent of South Africa's fish meal production; exports accounted for 5 percent.

Exports of fish meal from Denmark fell 7 percent in 1977 to 263,800 metric tons, primarily because of resource-related constraints. Denmark is facing a complex of problems--low resource levels, increased use of resources for products for direct human consumption, new fisheries management regimes, and reduced access to resources that Danish fishermen had previously depended on to supply that country's fish meal and oil industry.

Among the major exporters of fish meal, Iceland alone significantly increased both production and exports of fish meal in 1977. Production increased 55 percent from 1976 to about 170,000 metric tons, and exports increased 46 percent to about 149,000 metric tons.

Prices

Prices of fish meal in the United States, Europe, and Japan exhibited reasonably similar upward patterns from mid-1975 to about May 1977 (fig. 1). After May 1977, prices in the United States and Europe declined sharply, with those in the United States falling more steeply and recovering more slowly. By contrast, prices in Japan remained relatively stable in April-October 1977; then, they moved to their peak for the year in November 1977 and declined sharply through early 1978.

The sharp decline of U.S. prices of fish meal in mid-1977 may be explained largely by the decline in prices of soybean meal and other feedstuffs in relation to increased supplies of soybeans. The contrasting tight supply situation for fish meal is suggested by the greater strength for prices of fish meal (fig. 2). The considerably greater strength of prices of fish meal in Japan compared with those in Europe and the United States may be explained by Japan's market reaction to reduced Japanese access to resources within the extended jurisdiction zones of other countries.

OUTLOOK

We expect continuing strength in world demand, and low world supplies for fish meal during 1978. The unusual phenomenon of U.S. trade surpluses (exports exceeding imports) could continue, depending on the difference between U.S. and European prices.

Total U.S. production of fish meal in 1978 should easily surpass both the 1977 and 1972-76 average levels. The question is by how much. If second-half output would reach only the 1972-76 average level of 181,000 short tons, then the annual output would be 318,000 short tons, about 12 percent above the 1972-76 annual average. If U.S. total production of fish meal in the second half of 1978 exceeds the 1972-76 average by 15 percent--the excess was 32 percent in the first half--then the 1978 annual output would be about 344,000 short tons, 21 percent above the 1972-76 annual average.

FISH SOLUBLES

REVIEW

U.S. new supplies of fish solubles (production plus imports) in 1977 were lower than in 1976 (table 6); most of the decline was in the third quarter for menhaden solubles. Although official figures are not available, industry sources indicate that a significant amount of fish solubles was exported in 1977.

During the first 6 months of 1978, new supplies of fish solubles (production plus imports) were 20 percent ahead of a year earlier, with the 34-percent increase in production of menhaden solubles being partially offset by the decline in production of solubles from unclassified species (table 7). The increase in production of menhaden solubles was less than the increases for menhaden meal and oil.

Average weekly wholesale prices of menhaden solubles declined during 1977 from a high of $180 per short ton in May-June to about $130 from late July onward. During the first half of 1978, average weekly prices have been about $135 to $140 per short ton, except for a brief rise from late April to early June.

Table 6.--New supplies of fish solubles in the United States, 1976 and 1977

Component	1976	1977	Change
	-Thousand short tons-		-Percent-
Production			
Menhaden 1/	95,313	87,390	- 8
Unclassified	37,794	34,896	- 8
Total	133,107	122,286	- 8
Imports	1,221	820	- 33
Total new supplies	134,328	123,106	- 8

1/ May include small quantities made from other species.

Table 7.--New supplies of fish solubles in the United States, January-June 1977 and 1978

Component	1972-76 average	1977	1978	Change 77 to 78
	-Thousand short tons-			-Percent-
Production				
Menhaden 1/	30.9	29.8	39.9	+ 34
Unclassified	16.0	14.6	12.8	- 12
Total	46.9	44.3	52.7	+ 19
Imports	1.0	0.2	1.0	+ 326
Total new supplies	47.0	44.6	53.6	+ 20

1/ May include small quantities made from other species.
2/ Less than 50 tons.

OUTLOOK

We estimate that U.S. production of fish solubles will be above both 1977 and 1972-76 average annual levels of about 122,000 and 134,000 short tons, respectively.

FISH OIL

REVIEW

U. S. production and exports of fish oil in 1977 were well below both 1976 and 1972-76 average levels, while U.S. industrial utilization was closer to earlier levels (table 8). Most of the decline in production is attributable to the shortfall for menhaden oil. The drop in output of menhaden oil (down 42 percent from the 1972-76 average output) was caused primarily by a low oil yield, although the catch was also down (7 percent from the 1972-76 average catch). Exports were cut virtually in half from the 1976 level. Exports to all the major buying countries were down (Belgium, Colombia, the Netherlands, South Africa, and the United Kingdom), except for West Germany, which imported about the same amount as in 1976.

U.S. production of fish oil in January-June 1978 was well above both low year-earlier and 1972-76 average levels. Production of menhaden oil, the principal U.S. fish oil, was 128 percent above a year earlier, compared with increases of 51 percent for menhaden meal, 34 percent for menhaden landings. This means that the oil yield is considerably improved.

Table 8.--U.S. supply and utilization of fish oil,1976 and 1977, and 1972-76 average

Component	1972-76 average	1976	1977	Change 76 to 77
	-Million pounds-			-Percent-
New supplies				
Production				
Menhaden 1/	196.8	186.4	116.1	- 38
Anchovy	7.7	5.3	6.2	+ 16
Tuna-mackerel	6.4	6.3	4.1	- 35
Unclassified	9.3	6.5	7.3	+ 12
Total	220.3	204.6	133.7	- 35
Imports	16.7	23.9	17.6	- 26
Total	237.0	228.4	151.4	- 34
Utilization				
Exports	202.2	179.2	90.6	- 49
Consumption	33.1	38.4	35.4	- 8
Total	235.4	217.7	126.1	- 42
Apparent stock change	+1.6	+10.8	+25.3	-

1/ May include small quantities made from other species.

Table 9.--U.S. supply and utilization of fish oil, January-June 1977, 1978, and 1972-76 average

Component	1972-76 average	1977	1978	Change 77 to 78
	-Million pounds-			-Percent-
New supplies				
Production				
Menhaden 1/	66.1	46.7	106.5	+ 128
Anchovy	1.4	0.2	2/	2/
Tuna-mackerel	2.5	1.8	1.8	+ 1
Unclassified	2.7	2.1	3.1	+ 48
Total	72.7	50.8	111.4	+ 119
Imports	-	5.9	9.2	+ 56
Total	-	56.7	120.5	+ 112
Utilization				
Exports	45.0	22.0	3/35.1	+ 60
Domestic use	15.2	10.2	15.9	+ 56
Total	60.2	32.2	51.1	+ 58
Apparent stock change	-	+24.5	+69.4	-

1/ May include small quantities from other species.
2/ Anchovy included with unclassified oil in 1978.
3/ May include exports of whale and sperm oil, which have not been reported separately since January 1978.

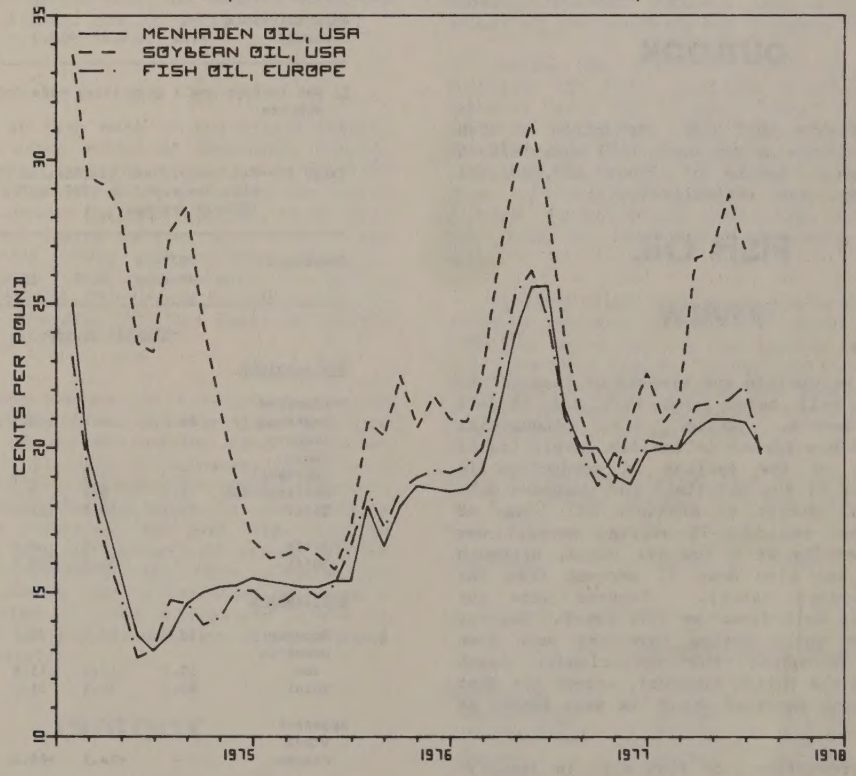
U.S. exports are recovering. Exports of fish oil, which accounted for 86 percent of the 1972-76 average annual disappearance of fish oil, were limited by low carryover stocks in the first quarter, but gained strength in the second quarter when the new season for menhaden opened and exceptionally good menhaden oil yields occurred.

Prices

Wholesale prices of menhaden oil in the United States were about 19 to 21 cents per pound from late July 1977 through July 1978, after having declined sharply from a high of about 26 cents per pound in May-June 1977 (fig. 3). That drop followed the declines in prices of soybean oil and other commodities in the international fat-oil market. In contrast to that trend, prices of fish oil did not follow U.S. prices of soybean oil in 1978, which rose from 21 cents per pound in January to 27 cents in June. Prices of soybean oil advanced even with total world production and exports of oils and fats predicted by some sources to be significantly higher in 1978 than in 1977. This indicates strong demand. Of course, speculative actions can cause these prices to fluctuate with news of oilseed crop developments both here and abroad.

With generally strong world demand for fats and oils, the failure of prices of fish oil to follow the sharp rise in prices of soybean oil in 1978 reflects the feeling in the market that world supplies of fish oil will be more than adequate to meet increased demand. Our estimates, which follow, suggest that a 5-percent increase in total exports of fish oil by net exporting countries is possible in 1978.

Figure 3.--U.S. PRICES OF FISH OIL AND SOYBEAN OIL, AND EUROPEAN PRICE OF FISH OIL, 1975-78



Soybean oil, United States: crude, tank cars, f.o.b. at Decatur, Ill.

Menhaden oil, United States: crude, tank cars, f.o.b. East Coast. plants, quoted at New York City.

Fish oil, N.W. Europe: crude, any origin.

This estimate compares with the estimated 10-percent increase in world total exports of oils and fats, including the oil equivalent of oilseeds, for 1978 (up 1.6 million metric tons to about 17.5 million metric tons, USDA, Fats and Oils Situation, July 1978). However, some industry sources suggest that the market may be anticipating larger increases in exports of fish oil, particularly from Japan. Yet to be determined is whether the price of 19 cents per pound (late July and early August 1978) fully reflects the market's appraisal of the possible increase in world exports of fish oil, or whether the prices of fish oil will decline further in 1978--disregarding any changes associated with upward or downward movements of prices of fats and oils in general.

Our estimates of increased exports of fish oil in 1978 may be broken down as follows: Norway, the leading exporter of fish oil in 1977, exported about 195,000 metric tons in both 1976 and 1977, but production and exports were an estimated one-third lower in the first half of 1978 compared with a year earlier. Japan was the second leading exporter of fish oil in 1977 (exporting 107,000 metric tons vs. 72,900 metric tons in 1976) and exported about twice as much fish oil in January-June 1978 as a year earlier (57,400 vs. 29,100 metric tons). Some industry sources indicate that the market may be anticipating that rate of increase will prevail the entire year, although, as mentioned in the discussion of fish meal, actual production and exports of fish oil in Japan may be limited by the lower prices that Japanese fishermen receive for sardines. The growth in Japanese exports of fish oil is attributed to the increased catch of sardines, which has bolstered supplies of both fish meal and fish oil. The increased production of fish meal is being used domestically, thereby reducing the demand for imports of fish meal, while the fish oil is being largely exported. Among other major exporters of fish oil, Denmark is likely to export less fish oil in 1978 than in 1977 (about 74,500 metric tons), although exports in January-May 1978 were above a year earlier (20,900 vs. 17,700 metric tons). Judging by production and exports of fish meal in January-June 1978, Iceland may export about as much fish oil in 1978 as in 1977. Also judging by production of fish meal in January-June 1978, Chile could produce and export about 50 percent more fish oil in 1978 than in 1977 (exports of 32,200 metric tons). As already indicated, exports of fish oil by the United States in 1977 were abnormally low (about 41,100 metric tons vs. 81,300 metric tons in 1976), but production is well above normal in the main season for the menhaden fisheries in 1978 (about May-October). Even if rates of increase in production decline somewhat from early-season highs, 1978 should be an excellent year, and exports could surpass the 1972-76 average of 92,000 metric tons.

Summarizing our estimates, if exports of fish oil from Norway are as much as one-third lower in 1978 than in 1977 (down about 65,000 metric tons), exports from several other countries could easily offset that decline: Chile, up 50 percent (an increase of 16,000 metric tons); Japan, up 30 percent (an increase of 30,000 metric tons); and the United States, up about 120 percent (an increase of 50,000 metric tons). These changes mean a net increase of 31,000 metric tons. This would result in a 5-percent increase in total exports of net exporting countries from the 1977 level (about 569,000 metric tons, Oil World Weekly compilation, partially estimated, April 28, 1978).

OUTLOOK

We expect a continuing strong market for fish oil. If the market has fully discounted the effect of possible increases in world exports of fish oil during 1978, then prices should remain near 19 cents per pound. Our estimates suggest that exports of fish oil by net exporting countries could exceed the 1977 level by 5 percent, compared to about 10 percent for total world trade in fats and oils. U.S. production and exports of fish oil in 1978 are likely to be far closer to their respective 1972-76 annual average levels of 220 and 202 million pounds than to the low 1977 levels.

STATISTICAL APPENDIX

The Secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this department.

Table A 1.--Fish meal production, imports, and chick placements, 1959-77 1/

Year	Fish meal production				Imports				Total production plus imports	Chick placements
	Menhaden	Tuna and mackerel	Other species	Total	From Peru	From Canada	From other countries	Total		
	Thousand short tons									Million birds
1959	223.9	25.4	47.5	296.8	49.9	39.0	44.0	132.9	429.7	1,632.7
1960	218.4	26.5	36.5	281.4	68.2	31.0	32.4	131.6	413.0	1,738.3
1961	247.6	21.2	31.7	300.5	151.4	38.2	28.2	217.8	518.3	1,916.5
1962	239.7	26.6	34.7	301.0	186.2	42.8	23.2	252.3	553.3	1,993.9
1963	182.4	27.0	36.8	248.0	285.4	51.0	39.9	376.3	624.3	2,054.4
1964	160.4	21.1	43.6	225.1	348.0	54.8	36.3	439.1	664.2	2,149.6
1965	176.0	25.4	41.1	242.3	209.8	43.8	17.0	270.7	513.0	2,368.8
1966	135.0	25.3	52.1	212.4	276.6	43.6	127.5	447.8	660.2	2,594.4
1967	119.1	25.5	56.8	201.4	442.5	46.6	162.3	651.5	852.9	2,594.8
1968	143.2	28.8	55.0	227.0	635.9	65.1	154.2	855.3	1,082.3	2,621.7
1969	159.5	26.9	57.8	244.1	218.1	67.8	72.4	358.4	602.5	2,847.1
1970	188.6	26.7	41.8	257.0	153.2	75.4	22.8	251.5	508.5	3,000.9
1971	221.0	29.3	32.6	282.9	199.6	57.6	26.0	283.2	566.1	2,982.2
1972	193.6	43.2	37.3	274.1	352.2	27.6	12.1	392.0	666.1	3,110.2
1973	188.8	43.6	46.7	279.1	41.8	24.6	2.2	68.5	347.5	3,029.4
1974	203.9	48.2	39.5	291.7	29.4	30.3	8.6	68.3	359.9	2,935.9
1975	191.4	37.2	50.5	279.2	75.5	34.0	8.9	118.4	397.6	2,998.7
1976	212.6	40.1	46.4	299.0	79.4	34.0	27.0	140.4	439.4	3,306.5
1977	193.3	39.8	40.8	273.8	15.6	24.8	41.1	81.5	355.3	3,456.1

1/ Excludes meal made from shellfish.

Note: Figures may not add to total because of rounding.
1977 figures subject to revision.

Table A 2--Supplies of fish meal in the United States by month, 1972-76 average and 1977-78

Time period	Production				Imports				Total new supplies				Exports			Total		
	1972-76 average	1976	1977	1978	1972-76 average	1976	1977	1978	1972-76 average	1976	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978
	Thousand short tons																	
January	5.6	6.5	5.0	5.9	6.5	4.1	10.3	3.1	12.1	10.6	15.3	9.0	3.1	0.5	0.8	9.0	14.8	8.2
February	4.6	4.0	4.2	5.0	10.8	2.5	8.9	1.5	15.4	6.5	13.1	6.5	2.9	0.1	1.8	12.5	13.0	4.7
March	5.7	6.1	7.5	5.6	11.4	8.0	3.4	1.3	17.1	14.1	11.0	6.9	1.1	0.4	3.7	16.1	10.6	3.2
1st quarter	15.9	16.6	16.8	16.5	28.7	14.6	22.6	5.9	44.6	31.2	39.4	22.4	7.0	1.0	6.3	37.6	38.4	16.1
April	13.5	17.6	13.9	19.9	11.1	6.0	9.8	3.0	24.6	23.6	23.7	22.9	2.1	0.3	3.9	22.6	23.4	19.0
May	30.7	25.0	25.1	34.7	17.6	21.8	9.7	3.5	48.3	46.8	34.8	38.2	0.7	2.6	1.2	47.6	32.2	37.0
June	43.0	42.1	46.7	64.8	15.2	14.6	11.7	2.4	58.2	56.7	58.4	67.3	1.6	0.3	5.7	56.6	58.1	61.6
2d quarter	87.2	84.7	85.7	119.4	43.9	42.4	31.2	9.0	131.1	127.0	116.8	128.4	4.3	3.2	10.8	126.8	113.7	117.6
July	54.0	55.7	46.4		22.3	13.1	6.9		76.3	68.9	53.3		2.3	2.7		74.0	50.6	
August	49.2	54.1	39.9		13.6	12.6	7.7		62.8	66.7	47.6		2.6	5.2		60.2	42.4	
September	32.9	41.8	38.7		17.0	26.3	4.0		49.9	68.1	42.7		3.5	6.7		46.4	36.0	
3d quarter	136.1	151.7	125.0		52.9	51.9	18.6		189.0	203.6	143.6		8.4	14.6		180.6	129.0	
October	20.3	18.6	21.1		17.7	15.8	2.8		38.0	34.4	23.9		3.1	11.8		34.9	12.2	
November	14.1	14.9	12.0		11.1	10.8	2.2		25.2	25.6	14.3		2.0	0.7		23.1	13.6	
December	11.0	12.6	13.3		3.3	4.8	4.1		14.3	17.4	17.3		4.6	5.0		9.6	12.4	
4th quarter	45.4	46.1	46.4		32.0	31.4	9.1		77.4	77.5	55.5		9.8	17.4		67.6	38.1	
Total	284.5	299.0	273.8		157.5	140.4	81.5		442.1	439.4	355.3		29.5	36.1		412.6	319.2	

Note: Production excludes meal from shellfish. 1977 and 1978 figures are preliminary.
Figures may not add to total because of rounding.

Source: NMFS, Data Management and Statistics Division; Bureau of the Census.

Table A 3.--U.S. fish meal production by species, by month, 1972-76 average, and 1977-78

Time period	Anchovy			Menhaden			Tuna and mackerel			Unclassified			Total		
	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978
	Thousand short tons														
January	1.9	0.4	1/	0.1	1.0	2.0	2.6	2.5	2.7	1.1	1.1	1.2	5.6	5.0	5.9
February	1.2	0.4	-	-	-	-	2.4	2.7	2.9	1.0	1.2	2.1	4.6	4.2	5.0
March	0.6	2.0	1/	-	-	-	3.7	3.8	3.8	1.4	1.7	1.8	5.7	7.5	5.6
1st quarter	3.7	2.8	1/	0.1	1.0	2.0	8.7	9.0	9.4	3.4	4.0	5.1	15.9	16.8	16.5
April	2.7	2.1	-	5.1	7.3	14.7	4.0	2.8	3.8	1.7	1.6	1.4	13.5	13.9	19.9
May	1.4	1.2	1/	23.4	19.8	28.9	3.5	2.5	4.0	2.3	1.6	1.8	30.7	25.1	34.7
June	-	-	-	36.1	41.4	59.3	3.9	2.5	3.7	3.1	2.7	1.8	43.0	46.7	64.8
2d quarter	4.1	3.3	1/	64.6	68.5	103.0	11.4	7.8	11.6	7.1	6.0	5.0	87.2	85.7	119.5
July	-	-		46.9	39.4		3.7	4.1		3.4	3.0		54.0	46.4	
August	0.1	-		41.4	33.8		4.0	3.8		3.7	2.3		49.2	39.9	
September	1.3	1.0		25.1	31.2		3.6	3.8		2.9	2.7		32.9	38.7	
3d quarter	1.4	1.0		113.4	104.4		11.4	11.6		9.9	7.9		136.1	125.0	
October	2.9	5.1		11.6	10.1		3.8	4.1		2.1	1.8		20.3	21.1	
November	3.6	4.2		5.8	3.1		3.6	3.7		1.1	0.9		14.1	12.0	
December	3.7	2.7		2.7	6.0		3.6	3.4		1.0	1.1		11.0	13.3	
4th quarter	10.2	12.0		20.0	19.3		11.0	11.3		4.2	3.8		45.4	46.4	
Total	19.4	19.1		198.0	193.3		42.5	39.8		24.7	21.7		284.6	273.8	

1/ Included with unclassified.

Note: Production excludes meal from shellfish.
Figures may not add to total because of rounding. 1977 and 1978 figures are preliminary.

Source: NMFS, Data Management and Statistics Division.

Table A 4.--U.S. imports of fish meal by country of origin, by month, 1972-76 average, and 1977-78

Time period	Canada			Chile 1/	Norway			Peru			Other countries 2/			Total		
	1972-76 average	1977	1978	1972-76 average	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978
	Thousand short tons															
January	1.6	1.3	1.1	-	0.5	-	-	4.3	7.9	-	0.1	1.1	1.9	6.5	10.3	3.1
February	1.1	1.1	1.4	-	0.8	-	-	8.9	7.7	-	0.1	3/	0.1	10.8	8.9	1.5
March	1.4	2.0	1.3	-	0.7	-	-	8.8	-	-	0.4	1.4	-	11.4	3.4	1.3
1st quarter	4.1	4.5	3.9	-	2.0	-	-	21.9	15.6	-	0.7	2.6	2.0	28.7	22.6	5.9
April	2.3	2.1	2.9	1.0	1.2	5.2	-	6.5	-	-	0.1	2.5	0.1	11.1	9.8	3.0
May	2.3	1.9	3.5	-	0.9	4.9	-	14.3	-	-	0.1	2.9	-	17.6	9.7	3.5
June	2.5	1.7	2.4	-	0.5	7.7	-	12.2	-	-	3/	2.3	-	15.2	11.7	2.4
2d quarter	7.0	5.7	8.9	1.0	2.7	17.8	-	33.0	-	-	0.2	7.7	0.1	43.9	31.2	9.0
July	3.4	2.1		-	-	3.6		18.1	-		0.8	1.1		22.3	6.9	
August	4.0	3.2		-	-	2.2		9.2	-		0.5	2.3		13.6	7.7	
September	3.9	2.8		-	0.7	-		12.0	-		0.5	1.3		17.0	4.0	
3d quarter	11.3	8.1		-	0.7	5.8		39.2	-		1.8	4.7		52.9	18.6	
October	4.0	2.8		-	0.8	-		12.3	-		0.6	-		17.7	2.8	
November	2.1	2.2		0.5	-	-		8.5	-		3/	0.1		11.1	2.2	
December	1.6	1.6		0.1	0.7	-		0.7	-		0.2	2.5		3.3	4.1	
4th quarter	7.7	6.6		0.6	1.4	-		21.5	-		0.8	2.6		32.0	9.1	
Total	30.1	24.8		1.5	6.7	23.6		115.6	15.6		3.5	17.5		157.5	81.5	

1/ Imports from Chile in 1976-78 were nil, except in May 1977, when about 2,200 tons were received.
2/ Includes Chile, except in the 1972-76 average.
3/ Less than 50 short tons.

Note: Figures may not add to total because of rounding.

Source: Bureau of the Census.

Table A 5.--U.S. fish meal exports, annual, by country of destination, 1972-78

Country of destination	1972	1973	1974	1975	1976	1977	1978 Jan.-June
				-Short tons-			
Canada	78	2,685	2,163	3,050	1,817	2,076	89
Dominican Republic	579	396	690	1,309	412	-	504
Guatemala	206	160	-	-	-	-	-
Mexico	4,759	1,264	8,533	-	-	1,064	163
Belgium	-	865	-	-	-	-	-
Germany, West	2,407	21,886	33,006	3,066	17,217	22,832	6,577
Italy	-	-	275	-	-	-	113
Netherlands	270	189	-	-	-	-	-
Spain	764	488	466	-	-	-	-
United Kingdom	409	1,689	542	-	-	-	-
Yugoslavia	-	-	275	-	-	-	-
Iran	-	4,297	1,905	-	292	220	2,122
Lebanon	-	-	-	-	-	210	-
Saudi Arabia	-	-	-	-	-	154	415
Syria	-	-	-	-	661	-	-
Taiwan	-	-	-	-	-	1,781	94
Egypt	-	928	6,063	3,274	11,530	6,120	6,224
Ghana	660	1,542	506	847	782	711	300
Libya	-	-	866	-	-	-	-
Zaire	-	181	-	-	-	-	-
Australia	-	17	-	-	-	-	279
Other countries	219	145	225	237	430	935	246
Total	10,351	36,732	55,515	11,783	33,141	36,103	17,126

Source: Bureau of the Census.

Table A 6.--Broiler chicks placed in 21 States, and average broiler price at the farm by month, 1972-76 average, and 1976-78

Time period	Chicks placed				Percentage change in chicks placed			Broiler price at the farm		
	1972-76 average	1976	1977	1978	in 1976 from 1972-76 average	in 1977 from 1976	in 1978 from 1977	1976	1977	1978
	-Million-				-Percent-			-Cents/lb-		
January	289.1	300.7	316.1	337.0	+ 4.0	+ 5.1	+ 6.6	24.2	21.9	22.8
February	238.8	246.8	259.1	275.9	+ 3.4	+ 5.0	+ 6.5	25.2	24.3	24.3
March	250.9	264.4	276.7	285.5	+ 5.4	+ 4.6	+ 3.2	24.4	24.2	24.8
1st quarter	778.8	811.9	851.8	898.5	+ 4.3	+ 4.9	+ 5.5	24.6	23.5	24.0
April	255.3	272.8	285.0	296.0	+ 6.9	+ 4.5	+ 3.9	23.5	24.2	28.1
May	319.4	341.5	359.8	382.6	+ 6.9	+ 5.4	+ 6.4	24.6	24.1	27.2
June	253.3	275.1	285.8	308.1	+ 8.6	+ 3.9	+ 7.8	24.3	24.9	30.2
2d quarter	828.1	889.4	930.7	986.7	+ 7.4	+ 4.6	+ 6.0	24.1	24.4	28.5
July	298.9	329.2	338.7	368.4	+ 10.1	+ 2.9	+ 8.8	25.4	25.9	
August	238.3	256.5	254.6		+ 7.6	- 0.7		23.8	24.1	
September	221.3	249.2	255.6		+ 12.6	+ 2.6		22.8	23.8	
3d quarter	758.6	834.8	848.9		+ 10.1	+ 1.7		24.0	24.6	
October	262.0	286.7	310.4		+ 9.4	+ 8.3		20.6	22.7	
November	224.1	238.3	249.2		+ 6.3	+ 4.5		19.4	21.3	
December	231.5	245.3	265.2		+ 5.9	+ 8.1		19.7	20.2	
4th quarter	717.6	770.3	824.7		+ 7.3	+ 7.1		19.9	21.4	
Total	3,083.0	3,306.5	3,456.1		+ 7.2	+ 4.5		23.2	23.5	

Note: Figures may not add to total because of rounding. 1977 and 1978 figures are preliminary.

Sources: Delmarva Broiler Chick Report, U.S. Department of Agriculture, Statistical Reporting Service, and Poultry and Egg Situation, U.S. Department of Agriculture, Economic Research Service.

Table A 7.--Supply and utilization of fish meal in major exporting countries, January-April 1977 and 1978

Country and period	Beginning inventory	Production	Subtotal	Exports	Domestic consumption	Ending inventory
			-Metric tons-			
1977						
FEO countries 1/						
Chile	36,352	66,795	103,147	51,972	938	50,282
Iceland	3,665	101,286	104,951	75,005	1,600	28,346
Norway	139,358	210,782	350,140	135,286	6,664	208,190
Peru	148,033	199,027	347,060	187,038	42,809	117,213
South Africa	1,908	107,000	108,908	4,165	52,300	52,443
FEO total	329,316	684,890	1,014,206	453,466	104,311	456,474
Other countries						
Canada	3,589	9,908	13,497	6,587	4,998	2,039
Denmark	7,000	66,960	73,960	68,100	na	na
Grand total	339,905	761,758	1,101,663	528,153	na	na
1978						
FEO countries 1/						
Chile	45,790	108,891	154,681	64,621	3,634	86,109
Iceland	19,118	91,791	110,909	75,682	1,600	33,627
Norway	128,409	120,231	248,640	102,667	7,697	138,276
Peru	89,679	176,172	265,851	165,027	33,514	67,310
South Africa	7,273	76,500	83,773	300	41,473	42,000
FEO total	290,269	573,585	863,854	408,297	87,918	367,322
Other countries						
Canada	4,427	9,266	13,693	10,094	1,074	2,547
Denmark 2/	na	40,946	na	46,800	na	na
Grand total	na	623,797	na	465,191	na	na

1/ Excluding Angola, for which figures are not available.
2/ Data are for January-March only.
na - Not available.

Table A 8.--Supply and utilization of fish meal in major exporting countries, January-December 1976 and 1977

Country and period	Beginning inventory	Production	Subtotal	Exports	Domestic consumption	Ending inventory
			-Metric tons-			
1976						
FEO countries 1/						
Chile	27,041	218,298	245,339	198,099	9,928	36,352
Iceland	1,802	109,111	110,913	102,448	4,800	3,665
Norway	114,246	464,062	578,308	417,744	21,206	139,358
Peru	40,136	836,736	876,872	593,084	135,479	148,033
South Africa	1,780	208,273	210,053	43,145	166,000	1,908
FEO total	185,005	1,836,480	2,021,485	1,354,520	337,413	329,316
Other countries						
Canada	5,388	50,776	56,164	31,964	21,573	3,589
Denmark	15,000	325,000	340,000	284,600	48,400	7,000
Grand total	205,393	2,212,256	2,417,649	1,671,084	407,386	339,905
1977						
FEO countries 1/						
Chile	36,352	220,628	256,980	198,630	13,048	45,790
Iceland	3,665	169,558	173,223	149,204	4,800	19,118
Norway	139,358	464,799	604,157	450,310	25,438	128,409
Peru	148,033	492,700	640,733	436,000	116,400	89,679
South Africa	1,908	171,400	173,308	9,165	156,870	7,273
FEO total	329,316	1,519,085	1,848,401	1,243,309	316,556	290,269
Other countries						
Canada	3,589	44,531	48,120	27,626	16,531	4,427
Denmark	7,000	310,000	317,000	263,800	na	na
Grand total	339,905	1,873,616	2,213,521	1,534,735	na	na

1/ Excluding Angola, for which figures are not available.
na: Not available.

Source: Fishmeal Exporters Organization (FEO), Paris; Oil World Weekly, published by ISTA Mielke & Co., Hamburg; Canada, Fisheries and Marine Service, Ottawa; and other sources.

Note: Figures are preliminary, and may include slight discrepancies, owing to revisions, to differences in definition or reporting practices among sources and countries, and to other possible reasons. Figures for Denmark are partially estimated.

Table A 9.--FEO exports of fish meal by country of destination, January-April 1977 and 1978

Country of destination	Exports		Percentage of total FEO exports		Percentage change from 1976 to 1977
	1977	1978	1977	1978	
	-Thousand metric tons-		-Percent-		
France	13.7	12.9	3.0	3.2	- 5.8
Germany, West	56.1	62.6	12.4	15.3	+ 11.6
Greece	2.4	3.5	0.5	0.9	+ 45.8
Holland/Belgium	19.0	12.3	4.2	3.0	- 35.3
Italy	15.2	15.1	3.4	3.7	- 0.7
Switzerland	2.5	3.5	0.6	0.9	+ 40.0
United Kingdom	21.8	21.0	4.8	5.1	- 3.7
Scandinavian countries	37.4	38.3	8.2	9.4	+ 2.4
Socialist countries	135.7	147.6	29.9	36.2	+ 8.8
U.S.S.R.	11.3	-	2.5	-	- 100.0
United States	7.0	-	1.5	-	- 100.0
Cuba	7.8	15.7	1.7	3.8	+ 101.3
Iran	4.4	28.0	1.0	6.9	+ 536.4
Israel	2.6	-	0.6	-	- 100.0
Japan	56.5	16.3	12.5	4.0	- 71.2
Philippines	6.0	5.5	1.3	1.3	- 8.3
Taiwan	12.9	15.41	2.8	3.8	+ 19.5
Other	41.1	10.323	9.1	2.5	- 74.9
Total	453.4	408.0	100.0	100.0	- 10.0

Table A10.--FEO exports of fish meal by country of destination, January-December 1976-77

Country of destination	Exports		Percentage of total FEO exports		Percentage change from 1976 to 1977
	1976	1977	1976	1977	
	-Thousand metric tons-		-Percent-		
France	47.6	51.5	3.5	4.5	+ 8.2
Germany, West	248.9	175.5	18.4	15.4	- 29.5
Holland/Belgium	38.9	43.5	2.9	3.8	+ 11.8
Italy	64.6	39.0	4.8	3.4	- 39.6
Portugal	6.0	10.0	0.4	0.9	+ 66.7
Switzerland	7.3	10.0	0.5	0.9	+ 37.0
U.K./Eire	99.7	87.0	7.4	7.6	- 12.7
Scandinavian countries 1/	103.6	100.0	7.6	8.8	- 3.5
East European countries	371.8	295.0	27.5	25.9	- 20.7
U.S.S.R.	7.0	14.0	0.5	1.2	+ 100.0
United States 2/	90.6	33.0	6.7	2.9	- 63.6
Cuba	29.0	21.0	2.1	1.8	- 27.6
Latin American countries 3/	25.9	9.64	1.9	0.8	- 62.8
China, P.R.	34.8	5.0	2.6	0.4	- 85.6
Iran	34.2	22.8	2.5	2.0	- 33.3
Israel	5.8	17.6	0.4	1.5	+ 203.4
Japan	43.8	142.0	3.2	12.4	+ 224.2
Philippines	16.2	8.0	1.2	0.7	- 50.6
Taiwan	12.5	24.4	0.9	2.1	+ 95.2
Others	66.2	32.126	4.9	2.8	- 51.5
Total	1,354.4	1,141.066	100.0	100.0	- 15.8

1/ Does not include Denmark.
2/ Based on export figures reported by FEO countries.
3/ Includes Haiti; does not include Cuba.

Note: Recipient countries and categories are those given by FEO.

Source: Fishmeal Exporters Organization (FEO).

Table A11.--Selected average monthly wholesale prices and price ratio of fish meal to soybean meal, 1976-78

Period	Menhaden 1/	Tuna-mix 2/	Imported Peruvian 3/	Northwest Europe 4/	Japan 5/	Soybean 6/ 44% protein	Soybean 6/ 50% protein	Peruvian fish meal to 50% protein soybean meal
	-Dollars per short ton-							-Price ratio-
1976								
January	7/ 268.75	201.00	270.00	274.88	240.40	128.25	136.25	1.98
February	7/ 270.00	206.94	270.62	275.79	233.36	132.60	139.25	1.94
March	7/ 273.75	210.87	271.25	273.97	267.77	127.90	135.60	2.00
April	253.12	210.25	270.62	274.88	322.13	127.10	136.40	1.98
May	283.00	217.25	285.00	300.28	270.67	152.25	161.75	1.76
June	353.00	273.30	344.00	336.57	290.21	187.90	200.30	1.76
July	385.00	299.13	381.25	367.96	295.55	193.90	207.88	1.83
August	324.00	275.00	348.00	360.61	308.10	173.30	187.10	1.86
September	361.25	280.25	358.75	420.79	334.12	179.20	192.50	1.86
October	7/ 361.88	272.94	351.88	404.38	386.86	169.60	182.00	1.93
November	7/ 367.00	286.00	366.50	407.78	364.57	181.20	193.30	1.90
December	7/ 396.88	295.62	388.75	415.49	360.66	197.60	212.60	1.83
Average	324.80	252.38	325.55	342.78	306.20	162.57	173.74	1.87
1977								
January	412.50	323.13	404.50	423.43	413.94	207.00	224.25	1.80
February	423.75	357.50	416.67	410.05	413.18	211.00	230.38	1.81
March	433.33	364.38	7/431.25	401.16	443.00	226.20	246.60	1.80
April	7/ 483.13	367.82	7/479.38	438.86	477.33	275.63	299.00	1.60
May	486.00	390.50	482.50	458.81	471.16	258.25	283.50	1.70
June	423.75	405.97	435.00	433.09	481.70	225.30	247.10	1.76
July	327.50	275.00	358.75	405.29	480.17	162.00	182.75	1.96
August	318.75	247.50	325.00	346.77	473.16	140.30	160.90	2.02
September	332.50	244.06	335.00	369.95	479.01	143.65	162.40	2.06
October	349.00	304.13	345.00	414.13	507.63	135.00	150.75	2.29
November	363.13	275.00	358.33	419.12	520.62	161.70	177.90	2.01
December	366.25	288.75	365.00	420.58	476.29	160.13	175.13	2.08
Average	393.30	320.31	394.70	411.77	469.77	192.18	211.72	1.86
1978								
January	8/ 364.50	9/	366.00	409.82	447.81	162.20	175.40	2.09
February	8/ 363.33	9/	366.67	393.95	428.77	152.88	166.38	2.20
March	370.63	330.00	385.00	393.54	485.56	179.38	193.38	1.99
April	383.33	316.25	400.00	377.62	477.45	173.00	188.75	2.12
May	363.50	302.50	7/377.50	372.40	464.08	177.40	194.90	1.94
June	351.25	9/	9/	370.50		169.75	187.13	10/ 1.88
July	318.50	310.75	9/	363.33		172.00	187.25	10/ 1.70

1/ 60 percent protein, bulk, quoted by brokers at New York City, f.o.b. East Coast and Gulf plants.
2/ 55 percent protein, bulk, Los Angeles.
3/ 65 percent protein, bulk f.o.b., East Coast and Gulf ports.
4/ 65 percent protein, any origin, c & f Hamburg, West Germany.
5/ The average unit value of imports into Japan of fish meal and flour, c.i.f., excluding any duties on imports in excess of quotas, converted at the average monthly currency exchange rates.
6/ Bulk at Decatur, Ill.
7/ Nominal price.
8/ Asking price.
9/ No quotes.
10/ Ratio of menhaden meal price to 50 percent protein soybean meal price.

Source: For prices of fish meal in the United States: NMFS, Data Management and Statistics Division. For Hamburg prices: Oil World, ISTA Mielke & Co., Hamburg, West Germany. For soybean meal prices: Feed Market News, U.S. Department of Agriculture, Consumer and Marketing Service, Grain Division. For Japanese prices: Japan Tariff Association, Japan Exports and Imports; IMF, International Financial Statistics.

Table A12.--Fish solubles production, imports, and menhaden solubles prices January-December, 1953-77

Year	Production: Menhaden	Production: Other	Production: Total	Imports	Total supplies	Price: Actual 1/	Price: In 1972 2/ dollars	Menhaden meal to menhaden solubles
	-Thousand short tons-					-Dollars per short ton-		-Price ratio-
1953	39.5	42.5	81.5	-	81.5	107.50	182.57	1.24
1954	56.3	58.8	115.0	3.6	118.6	98.96	165.79	1.37
1955	61.9	49.0	110.9	3.3	114.2	75.00	122.99	1.81
1956	72.9	56.0	128.8	3.0	131.8	76.23	121.19	1.76
1957	69.4	52.9	122.3	9.7	132.0	93.23	143.39	1.39
1958	72.5	57.7	130.2	14.6	144.8	97.51	147.61	1.41
1959	108.1	57.3	165.4	26.6	192.0	67.62	100.51	1.89
1960	65.8	33.1	98.9	3.2	102.1	37.74	54.96	2.46
1961	73.3	38.9	112.2	6.7	119.0	47.25	68.20	2.48
1962	85.2	39.4	124.6	6.3	130.9	55.06	78.04	2.25
1963	74.8	32.6	107.4	7.1	114.5	63.08	88.11	1.99
1964	68.7	24.6	93.3	4.5	97.8	61.98	85.24	2.12
1965	73.2	21.7	94.8	5.1	100.0	58.28	78.42	2.89
1966	60.8	22.7	83.4	4.3	87.7	70.74	92.16	2.28
1967	51.8	22.9	74.7	3.7	78.3	63.24	80.03	2.16
1968	53.2	18.6	71.8	1.8	73.6	52.93	64.10	2.74
1969	63.3	18.4	81.7	0.2	81.8	49.60	57.20	3.51
1970	71.9	23.1	95.0	.5	95.4	51.88	56.79	3.56
1971	91.5	19.7	111.2	.1	111.2	47.30	49.26	3.33
1972	104.1	30.3	134.4	.1	134.5	43.45	43.45	4.27
1973	104.4	33.1	137.4	.3	137.7	134.62	127.24	3.51
1974	102.9	34.3	137.3	-	137.3	89.78	77.38	3.07
1975	83.6	44.2	127.8	.1	127.9	66.27	52.11	3.61
1976	95.3	37.8	133.1	1.2	134.3	124.57	93.05	2.78
1977	87.4	34.9	122.3	.8	123.1	148.55	105.12	2.51

1/ Average weighted by monthly production (between 1953 and 1958 simple average is quoted).
2/ Weighted average price divided by implicit price deflator for GNP (1972=100).

Note: Figures may not add to total because of rounding.
1977 figures subject to revision.

TABLE A13.--PRODUCTION AND AVERAGE PRICE OF FISH SOLUBLES, BY MONTH, 1972-76 AVERAGE AND 1976-78

	PRODUCTION: 1972-76 AVERAGE	PRODUCTION: 1976	PRODUCTION: 1977	PRODUCTION: 1978	PRICE (1): 1976	PRICE (1): 1977	PRICE (1): 1978	MENHADEN SOLUBLES TO MENHADEN MEAL: 1976	1977	1978
	- - - - - THOUSAND SHORT TONS - - - - -				- - - DOLLARS PER SHORT TON - - -			- - - PRICE RATIO - - -		
JANUARY	2.2	3.1	1.2	3.1	(2) 75.00	(2)140.00	(2)135.50	0.28	0.34	0.37
FEBRUARY	1.5	1.4	1.7	1.7	(2) 75.00	(2)144.38	(2)137.50	0.28	0.34	0.38
MARCH	2.7	3.5	3.6	1.9	80.62	(2)147.50	(2)137.50	0.29	0.34	0.37
1ST QTR	6.4	8.0	6.5	6.7	76.87	143.96	136.83	0.28	0.34	0.37
APRIL	6.6	8.4	8.9	8.2	79.38	(2)166.88	(2)142.50	0.31	0.35	0.37
MAY	13.7	10.1	10.7	12.8	93.75	(2)177.00	145.50	0.33	0.36	0.40
JUNE	20.2	17.1	18.2	24.8	118.50	(2)176.25	145.00	0.34	0.42	0.41
2ND QTR	40.5	35.6	37.8	45.7	97.21	173.38	144.33	0.33	0.38	0.39
JULY	24.4	25.4	18.6		138.75	(2)149.38	129.50	0.36	0.46	0.41
AUGUST	23.4	22.2	18.3		(2)128.00	(2)128.50		0.40	0.40	
SEPTEMBER	15.2	18.5	19.2		(2)127.50	(2)131.25		0.35	0.39	
3RD QTR	63.0	66.1	56.2		131.42	136.38		0.37	0.42	
OCTOBER	11.3	9.0	11.1		(2)127.50	(2)126.00		0.35	0.36	
NOVEMBER	7.9	9.9	6.1		(2)129.00	(2)127.50		0.35	0.35	
DECEMBER	4.9	4.5	4.6		(2)135.00	(2)133.75		0.34	0.37	
4TH QTR	24.1	23.4	21.8		131.17	129.08		0.35	0.36	
TOTAL	134.0	133.1	122.3		109.17	145.70		0.33	0.37	

(1) MENHADEN SOLUBLES IN TANK CARS; PRICE QUOTED BY BROKERS AT NEW YORK CITY, F.O.B. EAST COAST PLANTS.
(2) NOMINAL PRICE.

NOTE: FIGURES MAY NOT SUM TO TOTAL BECAUSE OF ROUNDING. 1977 AND 1978 FIGURES SUBJECT TO REVISION.

SOURCE: NMFS, DATA MANAGEMENT AND STATISTICS DIVISION.

Table A14.--Fish oil production, imports, exports, domestic use, and apparent stock changes, 1950-77

Year	U.S. production 1/					Imports 2/	Total supplies 3/	Exports 4/	U.S. industrial utilization 2/	Net c in st
	Menhaden	Tuna and mackerel	Herring	Other	Total					
	Million pounds									
1950	76.6	6.6	24.8	52.7	160.7	15.1	175.9	76.0	5/	5
1951	94.0	5.3	11.3	22.9	133.5	17.4	150.9	49.8	5/	5
1952	96.7	5.6	8.1	8.2	118.6	15.6	134.2	44.0	5/	5
1953	133.7	4.9	5.4	6.7	150.7	12.0	162.6	108.5	5/	5
1954	139.8	4.4	5.7	12.3	162.2	13.0	175.2	141.6	5/	5
1955	159.2	4.1	8.2	13.6	185.1	10.4	195.5	142.7	74.9	- 22
1956	168.2	5.3	13.7	10.1	197.3	10.7	207.9	140.9	81.3	- 14
1957	118.5	5.5	14.1	10.1	148.2	7.2	155.4	114.9	83.0	- 42
1958	128.0	4.7	13.2	15.7	161.6	4.9	166.6	94.0	67.5	+ 5
1959	154.7	4.5	15.0	9.0	183.2	6.8	189.9	144.5	58.6	- 13
1960	183.4	3.8	11.5	6.9	205.6	8.9	214.6	143.7	56.8	+ 14
1961	235.2	5.7	6.1	7.6	254.6	8.4	263.0	122.5	64.8	+ 75
1962	232.6	5.0	5.1	4.8	247.5	10.8	258.2	123.0	62.9	+ 72
1963	167.6	5.9	5.7	4.5	183.7	8.6	192.2	262.3	52.1	- 122
1964	157.7	4.8	10.3	4.2	177.0	11.8	188.8	151.5	47.7	- 10
1965	175.2	4.8	8.5	4.3	192.8	6.0	198.7	103.8	44.5	+ 50
1966	144.2	4.1	7.9	6.5	162.7	12.7	175.3	77.3	38.8	+ 59
1967	101.4	5.2	5.7	7.6	119.9	7.0	126.9	76.8	35.8	+ 14
1968	152.0	4.5	9.5	5.7	171.7	5.9	177.6	65.1	30.0	+ 82
1969	149.2	4.2	3.5	11.1	168.0	4.2	172.2	196.1	34.1	- 58
1970	186.3	3.5	5.4	10.9	206.1	5.5	211.6	158.8	31.4	+ 2
1971	244.0	4.9	5.9	10.2	265.0	7.5	272.5	229.9	26.5	+ 16
1972	167.0	5.0	5.1	11.3	188.4	9.4	197.9	193.2	29.8	- 34
1973	200.5	7.4	1.7	15.0	224.6	6.7	231.4	247.8	26.5	- 43
1974	217.0	5.8	6/	14.1	238.0	12.4	250.3	199.1	35.0	+ 16
1975	213.3	6.4	6/	25.9	245.7	11.3	256.9	191.8	36.8	+ 28
1976	186.4	6.3	6/	11.8	204.6	20.9	225.5	179.2	38.4	+
1977	116.1	4.1	6/	13.5	133.7	13.7	147.4	90.6	35.4	+ 27

1/ Excludes whale and sperm oils.
2/ Excludes liver, whale and sperm oils.
3/ Production plus imports.
4/ Does not include exports of foreign merchandise.
5/ Not available.
6/ Included with other.

Note: Figures may not add to total because of rounding
1977 figures subject to revision.

Table A15.--U.S. production of fish oil, by month, 1972-76 average, and 1976-78

Time period	Anchovy			Menhaden			Tuna and mackerel			Other			Total			
	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1977	1978	1972-76 average	1976	1977	1978
	Million pounds															
January	0.6	0.1	4/	1/	0.1	0.1	0.3	0.3	0.3	0.2	0.1	0.2	1.2	1.6	0.6	0.6
February	0.2	2/	-	-	-	-	0.3	0.3	0.3	0.2	0.3	0.3	0.7	0.7	0.6	0.6
March	0.1	2/	4/	-	-	-	0.5	0.3	0.2	0.2	0.3	0.4	0.8	0.9	0.6	0.6
1st quarter	1.0	0.1	4/	1/	0.1	0.1	1.1	0.9	0.8	0.6	0.7	1.0	2.7	3.2	1.8	1.8
April	0.3	0.1	-	4.7	4.4	16.1	0.5	0.4	0.3	0.3	0.3	0.2	5.9	9.0	5.2	16.4
May	0.2	2/	-	26.0	13.4	29.4	0.5	0.1	0.5	0.8	0.3	0.8	27.4	18.7	13.9	30.4
June	-	-	-	35.3	28.8	60.9	0.5	0.4	0.3	0.9	1.1	1.1	36.8	32.2	30.3	62.
2d quarter	0.4	0.1	-	66.1	46.6	106.4	1.5	0.9	1.1	2.0	1.7	2.1	70.0	60.0	49.3	109.
July	-	-		46.4	23.4		0.6	0.4		1.5	1.5		48.4	39.5	25.3	
August	0.1	3/		43.8	16.5		0.7	0.5		1.7	0.8		46.1	43.8	17.8	
September	0.9	0.9		27.5	19.6		0.7	0.4		1.8	0.9		30.9	39.4	21.8	
3d quarter	0.9	0.9		117.6	59.4		1.9	1.3		5.0	3.2		125.4	122.6	64.8	
October	1.6	2.4		10.7	7.6		0.8	0.4		1.2	1.0		14.3	13.0	11.4	
November	2.2	1.9		1.9	1.2		0.6	0.4		0.3	0.3		4.9	3.7	3.7	
December	1.7	0.7		0.6	1.2		0.5	0.2		0.2	0.4		2.9	2.0	2.6	
4th quarter	5.4	5.0		13.1	10.0		2.0	1.1		1.6	1.7		22.1	18.7	17.8	
Total	7.7	6.2		196.8	116.1		6.4	4.1		9.3	7.3		220.3	204.6	133.7	

1/ Less than 50,000 pounds.
2/ Included with April.
3/ Included with September.
4/ Included with unclassified.
Note: Figures may not add to total because of rounding.
1977 and 1978 figures subject to revision.

Source: NMFS, Data Management and Statistics Division

TABLE A16.--U.S. EXPORTS, DOMESTIC INDUSTRIAL USE, AND TOTAL DISAPPEARANCE OF FISH OIL, BY MONTH, 1972-76 AVERAGE, AND 1976-78

	EXPORTS (1)				DOMESTIC DISAPPEARANCE (2)				TOTAL DISAPPEARANCE			
	1972-76 AVERAGE	1976	1977	1978	1972-76 AVERAGE	1976	1977	1978	1972-76 AVERAGE	1976	1977	1978
	MILLION POUNDS											
JANUARY	9.0	9.0	0.7	2.5	2.4	2.9	2.2	3.1	11.4	11.8	2.9	5.7
FEBRUARY	4.7	1.1	1.0	2.4	2.5	3.1	2.7	2.0	7.2	4.2	3.7	4.4
MARCH	3.2	3.2	3.7	2.9	2.4	3.3	3.3	2.3	5.5	6.5	7.0	5.2
1ST QTR	16.9	13.3	5.4	7.8	7.2	9.3	8.1	7.5	24.1	22.6	13.6	15.2
APRIL	1.3	0.1	(3)	2.8	2.7	3.7	3.2	2.8	4.0	3.8	3.2	5.6
MAY	4.7	5.1	1.5	8.5	2.7	3.3	3.3	3.0	7.4	8.5	4.8	11.5
JUNE	22.1	12.4	15.0	16.1	2.7	3.5	2.6	2.7	24.8	15.9	17.7	18.8
2ND QTR	28.1	17.7	16.6	27.4	8.0	10.5	9.1	8.5	36.1	28.2	25.6	35.9
JULY	32.1	33.1	16.1		2.8	2.3	2.8		34.9	35.4	18.9	
AUGUST	35.7	35.0	31.5		3.7	3.4	3.0		39.4	38.5	34.6	
SEPTEMBER	22.1	42.1	5.7		3.1	3.9	3.4		25.2	46.1	9.0	
3RD QTR	89.9	110.3	53.3		9.6	9.7	9.2		99.5	119.9	62.5	
OCTOBER	35.3	16.5	6.9		3.0	3.0	2.4		38.3	19.5	9.3	
NOVEMBER	12.1	14.6	3.3		2.8	3.1	3.9		14.8	17.8	7.2	
DECEMBER	20.1	6.8	5.1		2.5	2.8	2.8		22.5	9.7	7.8	
4TH QTR	67.4	37.9	15.3		8.3	9.0	9.1		75.7	46.9	24.4	
TOTAL	202.2	179.2	90.6		33.1	38.4	35.4		235.4	217.7	126.1	

(1) BEGINNING IN JANUARY 1978, MAY INCLUDE EXPORTS OF WHALE AND SPERM OIL.
(2) INCLUDES MARINE MAMMAL OIL OTHER THAN SPERM OIL AND SOME HYDROGENATED FAT (VEGETABLE AND ANIMAL) AND OTHER FATS AND OILS IN PROCESS.
(3) LESS THAN 50,000 POUNDS.

SOURCE: BUREAU OF THE CENSUS. CURRENT INDUSTRIAL REPORT, FATS AND OILS, PRODUCTION CONSUMPTION AND STOCKS, SERIES: M20K(72-78).

NOTE: FIGURES MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.

Table A17.--U.S. fish oil exports, annual, by country of destination, 1972-78

Country of destination	1972	1973	1974	1975	1976	1977	1978 Jan.-June
	Thousand pounds						
Canada	2,578	1,181	1,255	1,241	191	312	381
Mexico	124	195	309	198	269	284	239
Panama	68	-	-	-	-	-	4
Argentina	-	-	-	-	-	402	19
Colombia	-	10,667	8,846	-	26,598	5,576	1,126
Belgium	2,250	1,212	-	4,797	11,305	1,102	9
Denmark	2,425	-	-	-	-	-	-
France	-	8	-	-	-	1,921	3
Germany, West	26,250	5,511	11,467	12,080	13,855	13,968	3,698
Italy	-	-	-	-	285	-	-
Netherlands	82,220	146,386	147,067	55,408	82,905	52,554	23,987
Norway	9,171	-	11,038	-	1,323	2,200	-
Sweden	61,558	37,980	13,889	41,577	2,212	3,272	-
United Kingdom	11	41,388	4,122	74,628	34,088	7,938	3,536
Japan	49	22	-	-	-	-	151
Lebanon	1,212	2,583	442	1,342	-	-	2
South Africa	4,590	-	-	-	5,176	-	-
Australia	535	583	561	-	664	696	6
Other countries	157	77	125	572	364	408	1,981
Total	193,198	247,793	199,122	191,843	179,235	90,633	35,143

Note: Figures may not add to total because of rounding.

Source: Bureau of the Census.

Table A18.--Selected average monthly prices of fish and soybean oils, and price ratio of menhaden oil to soybean oil, 1976-78

Time period	Anchovy 1/	Menhaden 2/	Tuna 3/	Northwest Europe 4/	Soybean 5/	Menhaden oil to soybean oil
	Cents per pound					Price ratio
1976						
January	12.5	6/	7.6	14.6	16.2	-
February	12.5	6/	8.0	14.7	16.3	-
March	6/	15.2	6/	15.2	16.6	.92
April	6/	15.2	8.0	14.8	16.3	.93
May	6/	15.4	6/	15.3	15.8	.97
June	6/	15.4	6/	16.6	17.3	.89
July	6/	18.0	6/	18.5	20.9	.86
August	14.0	16.6	6/	17.2	20.4	.81
September	14.0	18.0	6/	18.6	22.5	.80
October	14.0	18.7	6/	19.0	20.7	.90
November	14.0	18.6	9.2	19.2	21.8	.85
December	14.0	18.5	9.5	19.1	21.0	.88
Average	13.6	17.0	8.5	16.9	18.8	.90
1977						
January	14.0	18.6	9.3	19.4	20.9	.89
February	14.0	19.2	9.5	20.0	22.4	.86
March	14.0	21.3	9.4	22.5	26.5	.80
April	14.0	23.9	9.5	25.3	29.6	.81
May	14.0	25.6	9.5	26.2	31.3	.82
June	6/	25.6	12.0	24.4	28.3	.90
July	6/	21.4	12.4	21.1	23.8	.90
August	6/	20.0	12.5	19.7	21.1	.95
September	6/	20.0	12.6	18.7	19.2	1.04
October	15.1	19.1	12.8	19.8	18.8	1.01
November	15.5	18.8	11.0	19.2	21.0	.90
December	15.5	19.9	10.5	20.3	22.6	.88
Average	14.5	21.1	10.9	21.4	23.8	.89
1978						
January	6/	20.0	6/	20.1	20.9	.96
February	6/	20.0	6/	20.0	21.6	.93
March	6/	20.6	6/	21.5	26.6	.77
April	6/	21.0	6/	21.6	26.8	.78
May	6/	21.0	6/	21.7	28.8	.73
June	6/	20.9	6/	22.1	26.9	.78
July	6/	20.0	6/	19.7		

1/ Crude oil, f.o.b. plants, quoted at Los Angeles.
2/ Crude oil in tank cars; f.o.b. East Coast plants, quoted at New York City.
3/ Crude oil, f.o.b. plants, quoted at Los Angeles.
4/ Crude oil, any origin, at Hamburg.
5/ Crude, tank cars, f.o.b. at Decatur, Ill.
6/ Supplies exhausted, no quotes.

Source: For U.S. prices: NMFS, Data Management and Statistics Division.
For NW. Europe prices: Oil World ISTA Mielke & Co., Hamburg, West Germany.
For soybean oil prices: Fats and Oil Situation, U.S. Department of Agriculture.

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